Instant Software Inc.

Peterborough, N.H. 03458 603-924-7296

PROGRAM DOCUMENTATION

Designed for use on
TRS-80*
16K
LEVEL II

Archimedes' Apprentice

$V = A \times B \times C$

A=Length
V=Volume
C=Height
B=Width
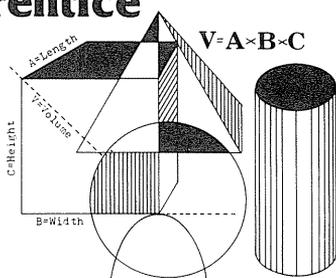
*A trademark of Tandy Corporation

0092R

Archimedes' Apprentice

INTRODUCTION

The Archimedes' Apprentice package is designed to teach you the formulas for determining the volume of various geometric figures. The package is divided into two programs. The first covers parallelepipeds, prisms, and pyramids. The second program covers cylinders, cones, and spheres. Both programs have sample problems for you to work and final examinations to test how much you have learned.

Part One

The first figure you'll work with is the parallelepiped. A parallelepiped (also known as a parallelepipedon) is any regular solid figure bounded by six parallelograms, of which the opposite pairs are equal and parallel. This includes cubes and rectangular solids.

The formula to find the volume of a parallelepiped is:

$$V = A \times B \times C$$

V=volume, A=length, B=width, and C=height.

The next figure will be the regular parallelepiped. The ends of a parallelepiped may be in the form of any plane figure such as triangles, squares, rectangles, rhomboids, polygons, and trapezoids, provided both ends are identical.

The formula to find the volume of a regular parallelepiped is:

$$V = (A \times H \times N)/2 \times C$$

A=the length of a side, H=the distance to the center of one end, N=the number of sides, and C=the length.

The third figure is the prism or wedge. This is a solid figure with triangular ends and three rectangles as sides.

The formula to find the volume of a prism is:

$$V = (A \times H)/2 \times C$$

A=the length of one of the sides of the triangles, H=the height from the base to the apex, and C=the length of the side.

The final figure you'll be working with in Part One is the pyramid. A pyramid is a solid figure having a plane figure as a base and sides which taper uniformly to a common point known as the apex. The base of a pyramid may be a triangle, a square, a rectangle, a rhombus, a rhomboid, a trapezoid, or a polygon.

The formula for finding the volume of a pyramid with a parallelogram for a base is:

$$V = (A \times B \times H)/3$$

A and B=the sides of the base and H=the height from the base to the apex. For pyramids with other plane figures for the base, calcu-

late the area of the base, then multiply by H, and divide the product by three.

Part Two

The first figure covered in Part Two is the cylinder. A cylinder is any solid figure whose two ends are circles of equal size and are parallel to each other — and whose transverse cross-section is circular and uniform throughout its entire length. Also any longitudinal cross-section will be rectangular in shape.

To find the volume of a cylinder, use this formula:

$$V = (3.1416 \times R \times R) \times L$$

R=the radius of the cross section and L=the length of the cylinder.

The next figure covered is the cone. A cone is a solid figure similar to a pyramid except that its base is a circle. The sides of a cone taper uniformly to the apex. A line drawn between the apex and the center of the base will always be perpendicular to the base of the cone.

To find the volume of a cone use this formula:

$$V = (3.1416 \times R \times R \times H)/3$$

R=the radius of the base and H=the perpendicular distance between the base and the apex.

The final figure you'll work with is the sphere. A sphere is a solid figure whose surface, at all points, is equidistant from its center. any cross-section which is either parallel with, or perpendicular to, any axis of the sphere will be a perfect circle.

To find the volume of a sphere, use this formula:

$$V = 4/3 \times (3.1416 \times R \times R \times R)$$

R=the radius of the sphere.

CONCLUSION

When doing any of the problems, always use the same units. For example, if you have a problem that involves yards, feet, and inches, first change all the dimensions to inches and then do the problem.

Go through this package in the sequence given. If you have trouble with any of the problems, go back and repeat that section. At the end of each part there will be a comprehensive examination. The computer will score your performance and suggest any sections you may need to repeat.